75 Years At Langley
Langley From The Ground Up
July 12, 1992|By KIRK SAVILLE Daily Press

Getting a job at NACA wasn't easy. Don Baals came to Langley in 1939 with a master's degree from Purdue University. But first he had to take a two-day test.

``It was tough,'' Baals said. ``I had a master's degree and I barely passed.''

Those who moved to Virginia found some of the conditions the same as in Wolfe's day. ``I thought it was a very difficult climate to adjust to,'' said John P. Reeder, who came to Langley from the University of Michigan in 1938. ``It was hot and humid and an awful lot of mosquitoes. My goodness, an awful lot of mosquitoes.''

The young engineers worked, lived and played together. Groups of five or six got together and rented houses on Chesapeake Avenue near Hampton Roads - places they called the X Club, Club 55 and Hoodlum Hall. Others lived in rooming houses. Some of the rooming houses had male and female residents, but relationships were conducted by the standards of the 1930s.

``There was strictly the old morality,'' Loftin said.

Phillips took his meals at a boarding house, getting two meals a day for $10 a week, including a big Sunday dinner. For an extra two dollars a week, he could get bag lunches to take to work.

Workers formed ``riding combinations'' - car pools to get to and from work.

Among the favorite off-duty activities were picnics to York County and Grandview. Ira H.A. Abbott is a child of NACA. His father came to work at Langley in 1929. The younger Abbott came to work at Langley in 1959 and still works for a NASA contractor.

Abbott remembered one picnic at Grandview. ``The only thing the kids had to drink was the melted water off the ice that kept the beer cold,'' Abbott said.

Abbott also remembered boat trips on the Chesapeake Bay, where NACA employees would help themselves to crab pots set out by watermen. ``They worked hard and they played hard and the two didn't mix,'' Abbott said.

NACA workers generally stayed to themselves, gaining a reputation as ``NACA Nuts.'' Loftin recalls that when Ford released new car models, they sent an engineer down to the local dealership to answer questions. ``NACA people asked all kinds of questions that the salesmen couldn't answer,'' Loftin said.

Langley employees had license plates on their cars that said ``NACA.'' Loftin remembers driving past the old Hampton High School, hearing the students chant, ``NACA NUT! NACA NUT!''

Eventually the engineers overcame the isolation from the community. ``We solved that problem by marrying into local families,'' said Baals, who married Madelynne Withers of Suffolk in 1943.

`` It was a 100 percent military effort.'' - Don Baals, aeronautical engineer

World War II transformed Langley. In 1938 the staff was 426. By 1945, more than 3,000 people, including 1,000 women, worked at Langley. The budget grew as well. Between 1940 and 1945, Langley's funding was $33 million. That compares to a total of $14 million over the previous 20 years.

The coming war prompted NACA to open Ames Aeronautical Laboratory in California and the Aircraft Engine Research Laboratory in Cleveland in the months before World War II.

The research effort focused on improving planes. One project, called drag clean-up, was done in the full-scale tunnel, which opened in 1931. The tests examined the drag, or wind resistance, caused by such things as antennas, gun ports, air scoops on planes, according to Hansen's history.

Langley tested almost all of the planes used in combat during the war, from single-engine fighters to the B-29 Superfortress used to bomb Japan.

Most long-term projects went on hold so researchers could concentrate on short-term improvements. ``This was not research, this was routine testing,'' said Richard Whitcomb, an engineer who started at Langley in 1943.

Langley engineers were inducted into the Army Air Corps reserves and put on inactive status. As long as they stayed at Langley, the engineers would remain inactive.

``If you desired to leave, you were immediately inducted into the Air Corps,'' Baals said.

Work went on 24 hours a day, and the work week was expanded to 48 hours.

``It really was pretty grinding,'' said Loftin, who worked in the Full Scale Research Division, frequently on the night shift. ``You got so you could barely keep your head up.''

The worst moments came in the hours before dawn, as Loftin worked calculations with his 20-inch-long slide rule. ``I tell you, I've looked at that slide rule at about 3:30 in the morning and tried to read those numbers, but I just couldn't,'' he said.

Most of the military's new planes came to Langley for drag testing. Usually the third plane off the assembly line was assigned to Langley, said Phillips, who still has an office at Langley and is a sort of researcher emeritus.

``There was a new fighter in every other month,'' said Baals, who retired in 1975. In such a frantic environment, suggestions and improvements made at Langley quickly worked their way back to the assembly line. ``You could find it on an airplane in a year,'' Baals said.

One example of the fast turnaround time was the B-29 Superfortress. A model of the plane was set up in the Langley 8-foot High Speed Tunnel in 1942. By the middle of 1944, the Superfortress was making headlines as it bombed Japan.

Reeder, who joined Langley as an aeronautical engineer in 1938 and retired in 1980, took flying lessons. He became a NACA test pilot in 1943. It was his job to fly new planes to find out what the problems were and how to improve them.

In August of 1943, he was flying a new fighter plane when a gauge broke, spewing oil in the cockpit. ``I was smothered with oil,'' he said. ``It just poured out oil. I came home with one eye open.''

The end of the war brought Langley into the jet age, with researchers working on the problems of supersonic flight.

``Right after the war was the most exciting time,'' said Whitcomb, who retired from Langley in 1980.

``We recognized that we'd gotten through the war by the skin of our teeth because the Germans had gotten to the jet engine first and they had the V-2 rocket,'' said Baals, referring to the rockets launched against Britain in the last part of the war.

Langley researchers faced the challenges of supersonic flight. Langley was adding high-speed wind tunnels as planes began approaching the speed of sound - about 800 mph. But engineers were having difficulty designing planes that would break the sound barrier. As aircraft approached the speed of sound, they encountered turbulence that drastically reduced their efficiency.

Richard Whitcomb came up with the idea of modifying the shape of the fuselage to allow the plane to slip through the sound barrier without causing as much air turbulence.

Another contribution to supersonic flight was the variable sweep wing. In the 1940s, Langley researchers realized that by sweeping back the wings, planes could fly more efficiently at high speeds.

``The unswept wing is still the most efficient at lower speeds,'' said Ed Polhamus, a Langley engineer who helped design the variable sweep wing, which is straight at low speeds but sweeps back when the plane goes supersonic. Some planes need both high and low speed capabilities, said Polhamus, who retired from Langley in 1981. For example, Navy fighter planes spend time patrolling above aircraft carriers at low speeds but need supersonic speeds to pursue other fighters.

The variable sweep wing was incorporated in the F-14, the mainstay of the Navy's fighter force, the F-111 and the B-1 bomber.

`` It was really just a freewheeling existence. You chose your own projects where all you had to do was convince somebody it was a good idea. If you couldn't sell your project, all you could do was sit behind your desk and twiddle your thumbs." - Max Faget, former Langley engineer

Researchers remember the 1940s and 1950s as a glorious time to work at Langley. Even as the organization grew, NACA remained a ``bottom up" organization. Researchers were given the freedom and support to work on projects they thought were important. Administrators tended to stay out of research, engineers said.

Part of the freedom came from the relatively small amounts of money involved. ``Nobody in Congress paid much attention to it," Polhamus said. ``They basically said, `OK, here's your budget, work on these problem areas and come back at the end of the year and tell us how it went.' "

Administrators realized that it was important to give researchers freedom to pursue their own ideas. ``It became very evident to me that if a researcher wants to do something it's damn hard to stop him, he'll find a way to bootleg it," said Loftin, who became an assistant director at Langley.

Bootleg projects were a tradition. Engineers would often work on a project without approval. This was often done to see if a research project was worth doing before an engineer got official approval of the idea. Some administrators thought bootleg projects were a sign of researchers taking their own initiative.

But researchers noticed a change when NACA switched to the National Aeronautics and Space Administration in 1958. The space program brought lots of money, attention and bureaucracy to Langley.

``The instant NASA was formed, it was a different organization," Baals said.

Other researchers said that with the millions of dollars pouring into the agency from the space program, the size of research projects grew, giving engineers less freedom to pursue their own projects.

Ira H.A. Abbott's father came back to Langley in 1962 after working at NASA headquarters in Washington, D.C. ``He couldn't find any bootleg projects," Abbott said. ``That really disturbed him. He said he'd been around long enough to know where to look."

Another change brought on by the switch to NASA was the rise of contractors, making Langley less self-sufficient. ``If you want something you can go out and buy it," Abbott said. ``Before you had to make it."

`` We locals at first regarded the bearded NACA [nuts] as weirdos, up to no good. But years later, when that research produced trips to the moon, we had to take it all back." - Parke Rouse Jr., historian, in ``The Good Old Days in Hampton and Newport News"

By the mid-1950s the problems of supersonic flight had largely been solved. Aeronautics, which had been wide open at the end of the World War II, was no longer interesting to some engineers. ``There was a feeling that all the exciting research had been done," Phillips said.

In 1957, the Soviets launched the first man-made satellite and Langley entered the space race. That meant new opportunities for research. ``It represented a brand new challenging field, and they were eager to get into it," said Faget, who came to Langley in 1946.

Faget went to work designing the Mercury space capsule. He came up with the design of a capsule that would ride to space, separate from the booster rocket and then splash down in the ocean. Faget left NASA in 1981 and is now president of Space Industries International, a Texas company that wants to build a privately financed space station.

Mercury was managed by the Space Task Group at Langley. In 1961, NASA announced that the group would be moving to the Manned Space Center in Houston, now called Johnson Space Center.

Abbott, who's father worked at NASA headquarters at the time, said the move was made partly because it was difficult for a research center like Langley that is concerned with long-term developments to coexist with an operations center like Johnson.

``You always need something right now," Abbott said, speaking about the short-term needs for a center like Johnson. ``The two are incompatible."

`` Don't listen to him! His figures lie! Just don't listen to him!" - A NASA engineer before a presentation by John Houbalt on lunar landings

Even before the first American orbited the Earth, Langley researchers were considering ways to send a man to the moon. Early plans called for a rocket large enough to land on the moon and return to Earth. Langley engineer John Houbalt realized that wouldn't work.

Launching a rocket like those used in the Mercury program took a sophisticated launch pad and ground crew of 3,000. That would be impossible from the moon, Houbalt reasoned.

``I thought, `Why not keep the living room in orbit and just send down a small landing vehicle?' " Houbalt said.

The result was the lunar lander, a small vehicle with a self-contained launch pad that would separate from the command module, land on the moon and then return to the mother ship.

``They wouldn't listen," Houbalt said. ``They wouldn't even consider it."

Wernher von Braun, the German immigrant who headed American rocket-building efforts, was against the idea. So was Faget. Others against the idea included President Kennedy's science advisor, Jerome Wiesner, and NASA Administrator James Webb.

Houbalt fought the space establishment for two years before he was able to persuade NASA that his method was the best. Houbalt resorted to unofficial channels to press his point. He wrote a nine-page letter to the associate administrator of NASA in Washington, D.C.

``Do we want to go to the moon or not?" Houbalt asked in his letter. ``Why is a much less grandiose scheme involving rendezvous ostracized or put on the defensive?"

The associate administrator promised to give the idea more attention. Eventually, Houbalt was able to convince others in the agency. Seven years later, Houbalt stood in mission control in Houston and watched as the first lunar lander settled on the moon. The room first burst into applause, followed by an immediate round of ``Shh! Shh!," so nobody would miss the first words from the moon.

In the middle of the celebration, Houbalt's old adversary von Braun turned to Houbalt, formed a circular OK sign with his fingers and said, ``John, your scheme is doing it."

``Tears were running down my face," Houbalt recalled. ``We had essentially zero knowledge when we started. We did the whole blooming thing in seven years."

Houbalt retired from NASA in 1985, but has remained active as a consultant.

A couple years before the first lunar lander touched down, Langley workers were going to work on the Viking Mars project and the Space Shuttle.

The Viking project was an overwhelming success. Started in 1967, the program involved two landers, which touched down on Mars in 1976. They were designed to send information for 90 days. One of the Viking landers ended up sending back information for six years.

In the late 1960s Langley engineers also went to work on the Space Shuttle. Various designs were tested in Langley wind tunnels. At one time, current Langley director Paul Holloway headed a team of Langley employees that developed the protective tiles that keep the shuttle from burning up when re-entering Earth's atmosphere.

The end of the Apollo program brought a reduction in the Langley staff. In 1967, just over 4,400 people worked at Langley. A decade later, the staff was about 3,200.

As the Apollo program ended, engineers saw new opportunities in aeronautics. Throughout the 1970s, Langley engineers studied ways of applying the computer revolution to airplanes.

Beginning in the mid-1970s, Langley researchers used ``Fat Albert," NASA's Boeing 737, to develop the electronic instruments used in modern airplanes that have replaced gauges and dials.

The plane was used to develop a flight management system, which allows pilots to enter their flight plan on a computer keyboard. The system is used on Boeing 767s.

Between 1979 and 1986, NASA's F106B Delta Dart was struck by lightning 714 times. The lightning strike tests were done as part of a program to determine the danger to planes posed by lightning.

As concern for the environment grew, Langley scientists turned to studying the Earth. During the 1980s, the Atmospheric Sciences Division used several satellites to study global change and Langley scientists were among the leaders in charting and explaining the ozone hole that forms over Antarctica every year.

Flying the 737 into potentially dangerous wind conditions, engineers are now working on several instruments that will warn pilots of wind shear, a downdraft associated with thunderstorms, has been blamed for causing several fatal air crashes.

`` This is where the dream of space started, and this is where the dream of space is going to be rekindled." - Daniel Goldin, NASA administrator, speaking to Langley employees in May

As NASA prepares to enter the 21st century, Langley is taking part in projects that could give man a permanent presence in orbit, on the moon and on Mars.

Langley staffers are studying the space station and trips to Mars. Researchers are perfecting technology that they hope will someday lead to a plane that can fly into space and reach speeds of 17,500 mph. Langley researchers are looking at a stubby-wing spaceship that would act as a space taxi, ferrying people and supplies into space.

Aeronautics researchers are looking at the possibility of building cost-effective supersonic airliner and jumbo jets, capable of carrying 600 passengers.

Engineers and scientists are working together to come up with a new type of satellite instrument that will use lasers, instead of natural light, to probe the atmosphere. Other satellites are studying how man's activity is changing the planet's climate.

NASA veterans are fond of saying the first A is for aeronautics, and in his speech at Langley, Goldin pledged to support Langley's major role in keeping the United States a world leader in that technology.